C-141 Electric Starlifter Completes Flight Certification Testing

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Payoff

The successful flight testing of the C-141 Electric Starlifter goes a long way toward verifying the reliability and maintainability (R&M) increases the More Electric Aircraft (MEA) concept will provide in an operational environment. Test and operational flying results can be applied to other Air Force aircraft to predict improved R&M and resulting operations and maintenance cost savings from possible fleet conversion to a MEA configuration.

Accomplishment

Under a program sponsored by the Reliability and Maintainability Technology Insertion Program Office, the Propulsion and Air Vehicles Directorates developed and flight tested a power-by-wire modification to both ailerons of a C-141A transport aircraft provided by the Air Force Flight Test Center. The tests represent the first time electric motor-driven actuators replaced hydraulic actuators on an Air Force transport aircraft intended for operational use. Results verified that the modified aircraft functioned and handled similar to the original configuration.

Background

The More Electric Aircraft (MEA) concept involves replacing the centralized hydraulic system with an electrical system capable of handling loads, such as flight control or landing gear actuation, even under faulted or battle damaged conditions. The actuation loads would then become electrically driven, hence the term “power-by-wire”. The MEA concept has been studied by the DoD and NASA for application to numerous types of aircraft, from fighters to commercial transports. Each of the studies predict improved reliability and maintainability for the MEA versions of the aircraft. The improvements stem partly from advanced electric systems, which can sense faults within a distribution network, and reroute power around impaired areas before the faults propagate throughout the system. Each element in the distribution network and each of the actuation loads would become a line replaceable unit, not requiring the fill and bleed maintenance actions of a hydraulic system. Previous testing to support reliability and maintainability predictions was principally extensive bench testing of components such as electric actuators, generators and electrical distribution hardware. Some flight testing was conducted to verify functional capability for specific applications, but no long term operational evaluations were available. The C-141 Electric Starlifter Program has completed the bench testing and initial flight certification phases, and has entered the operational evaluation phase, where AMC will use the modified C-141A for 1000 hours on airlift missions to CONUS and overseas locations. The missions are set up specifically for the Electric Starlifter to ensure only Flight Test Center crews familiar with the modification fly the airplane. Pilots and maintenance crews from AMC units will be given the opportunity to fly and examine the Electric Starlifter whenever possible to increase operational unit familiarity with the MEA concept.